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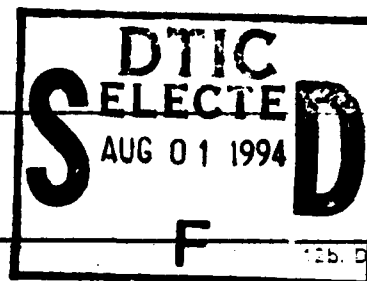
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13. ABSTRACT (Maximum 200 words)

Research has been done with pulsed-laser evaporated B, Be and Mg atoms and molecular hydrogen to explore the reactivities of these metals with He and to investigate infrared spectra of the product molecules in solid argon. The major products in the B/H₂ system were BH, (H₂)(BH), BH₃, (H₂)(BH₃) and B₂H₆. It is clear that molecular hydrogen is complexed to BH and BH₃ in these experiments.

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Research has been done with pulsed-laser evaporated B, Be and Mg atoms and molecular hydrogen to explore the reactivities of these metals with H_2 and to investigate infrared spectra of the product molecules in solid argon. The major products in the B/ H_2 system were BH, $(H_2)(BH)$, BH_3 , $(H_2)(BH_3)$ and B_2H_6 . It is clear that molecular hydrogen is complexed to BH and BH_3 in these experiments.

In the case of Be and Mg, the major products were the linear dihydride H-M-H and the monohydride M-H molecules. This work obtained the first experimental evidence for H-Be-H, which is the textbook example of sp hybridized bonding.

Work is in progress on $B+NH_3$. It appears that reaction occurs. Several new bands in the B-N stretching region are under analysis.

A paper has appeared on H-Be-H in *J. Am. Chem. Soc.* 1993, 115, 1211. Papers will appear in *J. Am. Chem. Soc.* 1994 on BH and in *J. Phys. Chem.* 1994 on H-Mg-H.

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